

Claims

- 2 1. A method for preparing a stabilized aqueous alkali or alkaline earth metal
hypobromite solution comprising:
- 4 a. Mixing an aqueous solution of alkali or alkaline earth metal hypochlorite
with a water soluble bromide ion source;
- 6 b. Allowing the bromide ion source and the alkali or alkaline earth metal
hypochlorite to react to form a 0.5 to 30 percent by weight aqueous solution of
8 unstabilized alkali or alkaline earth metal hypobromite;
- c. Adding to the unstabilized solution of alkali or alkaline earth metal
10 hypobromite an aqueous solution of an alkali metal sulfamate having a temperature of at
least 50°C in a quantity to provide a molar ratio of alkali metal sulfamate to alkali or
12 alkaline earth metal hypobromite is from about 0.5 to about 6; and then,
- d. Recovering a stabilized aqueous alkali or alkaline earth metal hypobromite
14 solution.
2. The method according to Claim 1, wherein the alkali or alkaline earth metal
2 hypochlorite is selected from the group consisting of sodium hypochlorite, potassium
hypochlorite, lithium hypochlorite, magnesium hypochlorite, and calcium hypochlorite.
3. The method according to Claim 1, wherein the bromide ion source is selected
2 from the group consisting of sodium bromide, potassium bromide, lithium bromide, and
hydrobromic acid.

4. The method according to Claim 1, wherein the alkali or alkaline earth metal
2 hypochlorite is sodium hypochlorite, the bromide ion source is sodium bromide, and the
alkali or alkaline earth metal hypobromite is sodium hypobromite.
5. The method according to Claim 1, wherein the aqueous solution of unstabilized
2 alkali or alkaline earth metal hypobromite contains from about 1 to about 20 % by weight
alkali or alkaline earth metal hypobromite.
6. The method according to Claim 1, wherein the aqueous solution of unstabilized
2 alkali or alkaline earth metal hypobromite contains from about 4 to about 15 % by weight
alkali or alkaline earth metal hypobromite.
7. The method according to Claim 4, wherein the aqueous solution of unstabilized
2 sodium hypobromite contains from about 1 to about 20 % by weight sodium
hypobromite.
8. The method according to Claim 4, wherein the aqueous solution of unstabilized
2 sodium hypobromite contains from about 4 to about 15 % by weight sodium
hypobromite.
9. The method according to Claim 7, wherein the pH of the stabilized aqueous
2 sodium hypobromite solution is from about 8 to about 14.

10. The method according to Claim 8, wherein the pH of the stabilized aqueous
2 sodium hypobromite solution is from about 11 to about 14.

11. The method according to Claim 9, wherein the molar ratio of the alkali metal
2 sulfamate to the sodium hypobromite is from about 0.5 to about 4.

12. The method according to Claim 10, wherein the molar ratio of the alkali metal
2 sulfamate to the sodium hypobromite is from about 0.5 to about 2.

13. A stabilized aqueous solution of an alkali or alkaline earth metal hypobromite
2 which is prepared by the steps of:

a. Mixing an aqueous solution of alkali or alkaline earth metal hypochlorite
4 with a water soluble bromide ion source;

b. Allowing the bromide ion source and the alkali or alkaline earth metal
6 hypochlorite to react to form a 0.5 to 30 percent by weight aqueous solution of
unstabilized alkali or alkaline earth metal hypobromite;

8 c. Adding to the unstabilized solution of alkali or alkaline earth metal
hypobromite an aqueous solution of an alkali metal sulfamate having a temperature of at
10 least 50°C in a quantity to provide a molar ratio of alkali metal sulfamate to alkali or
alkaline earth metal hypobromite is from about 0.5 to about 6; and then,

12 d. Recovering a stabilized aqueous alkali or alkaline earth metal hypobromite
solution.

14. The solution of Claim 13, wherein the alkali or alkaline earth metal hypochlorite
2 is selected from the group consisting of sodium hypochlorite, potassium hypochlorite,
lithium hypochlorite, magnesium hypochlorite, and calcium hypochlorite.

15. The solution of Claim 13, wherein the bromide ion source is selected from the
2 group consisting of sodium bromide, potassium bromide, lithium bromide, and
hydrobromic acid.

16. The solution of Claim 13, wherein the alkali or alkaline earth metal hypochlorite
2 is sodium hypochlorite, the bromide ion source is sodium bromide, and the alkali or
alkaline earth metal hypobromite is sodium hypobromite.

17. The solution of Claim 13, wherein the aqueous solution of unstabilized alkali or
2 alkaline earth metal hypobromite contains from about 1 to about 20 % by weight alkali or
alkaline earth metal hypobromite.

18. The solution of Claim 13, wherein the aqueous solution of unstabilized alkali or
2 alkaline earth metal hypobromite contains from about 4 to about 15 % by weight alkali or
alkaline earth metal hypobromite.

19. The solution of Claim 16, wherein the aqueous solution of unstabilized sodium
2 hypobromite contains from about 1 to about 20 % by weight sodium hypobromite.

20. The solution of Claim 16, wherein the aqueous solution of unstabilized sodium
2 hypobromite contains from about 4 to about 15 % by weight sodium hypobromite.
21. The solution of Claim 19, wherein the pH of the stabilized aqueous sodium
2 hypobromite solution is from about 8 to about 14.
22. The solution of Claim 20, wherein the pH of the stabilized aqueous sodium
2 hypobromite solution is from about 11 to about 14.
23. The solution of Claim 21, wherein the molar ratio of the alkali metal sulfamate to
2 the sodium hypobromite is from about 0.5 to about 4.
24. The solution of Claim 22, wherein the molar ratio of the alkali metal sulfamate to
2 the sodium hypobromite is from about 0.5 to about 2.
25. An industrial water system containing from about 0.05 to about 1000 ppm of the
2 solution of Claim 13.
26. An industrial water system containing from about 0.05 to about 1000 ppm of the
2 solution of Claim 16.
27. An industrial water system containing from about 0.05 to about 1000 ppm of the
2 solution of Claim 23.

28. An industrial water system containing from about 0.05 to about 1000 ppm of the
2 solution of Claim 24.

29. In a method for the laundering of soiled garments in which the soiled garments are
2 washed in an aqueous media containing a detergent and a bleaching agent, the
improvement comprises using as the bleaching agent the solution of Claim 13.

30. In a method for the laundering of soiled garments in which the soiled garments are
2 washed in an aqueous media containing a detergent and a bleaching agent, the
improvement comprises using as the bleaching agent the solution of Claim 16.

31. In a method for the laundering of soiled garments in which the soiled garments are
2 washed in an aqueous media containing a detergent and a bleaching agent, the
improvement comprises using as the bleaching agent the solution of Claim 23.

32. In a method for the laundering of soiled garments in which the soiled garments are
2 washed in an aqueous media containing a detergent and a bleaching agent, the
improvement comprises using as the bleaching agent the solution of Claim 24.

33. In a method for the manufacture of cellulosic materials in which cellulosic fibers
2 are bleached with an oxidizing agent, the improvement comprises using as the oxidizing
agent the solution of Claim 13.

34. In a method for the manufacture of cellulosic materials in which cellulosic fibers
2 are bleached with an oxidizing agent, the improvement comprises using as the oxidizing
agent the solution of Claim 16.

35. In a method for the manufacture of cellulosic materials in which cellulosic fibers
2 are bleached with an oxidizing agent, the improvement comprises using as the oxidizing
agent the solution of Claim 23.

36. In a method for the manufacture of cellulosic materials in which cellulosic fibers
2 are bleached with an oxidizing agent, the improvement comprises using as the oxidizing
agent the solution of Claim 24.

37. In a method for the control of microbiofouling in a recreational water system in
2 which an oxidizing agent is added to control microbiofouling, the improvement
comprises using as the oxidizing agent the solution of Claim 13.

38. In a method for the control of microbiofouling in a recreational water system in
2 which an oxidizing agent is added to control microbiofouling, the improvement
comprises using as the oxidizing agent the solution of Claim 16.

39. In a method for the control of microbiofouling in a recreational water system in
2 which an oxidizing agent is added to control microbiofouling, the improvement
comprises using as the oxidizing agent the solution of Claim 23.

40. In a method for the control of microbiofouling in a recreational water system in
2 which an oxidizing agent is added to control microbiofouling, the improvement
comprises using as the oxidizing agent the solution of Claim 24.

41. In a method for the control of microbiofouling occurring on the surfaces of
2 equipment in contact with produced oil field waters, the improvement comprises adding
to the produced oil field waters an anti-microbiofouling effective amount of the solution
4 of Claim 13.

42. In a method for the control of microbiofouling occurring on the surfaces of
2 equipment in contact with produced oil field waters, the improvement comprises adding
to the produced oil field waters an anti-microbiofouling effective amount of the solution
4 of Claim 16.

43. In a method for the control of microbiofouling occurring on the surfaces of
2 equipment in contact with produced oil field waters, the improvement comprises adding
to the produced oil field waters an anti-microbiofouling effective amount of the solution
4 of Claim 23.

44. In a method for the control of microbiofouling occurring on the surfaces of
2 equipment in contact with produced oil field waters, the improvement comprises adding
to the produced oil field waters an anti-microbiofouling effective amount of the solution
4 of Claim 24.

45. A method of controlling microbiofouling in an aqueous system which comprises
2 adding to the aqueous system an effective, anti-microbiofouling amount of the solution of
Claim 13.

46. A method of controlling microbiofouling in an aqueous system which comprises
2 adding to the aqueous system an effective, anti-microbiofouling amount of the solution of
Claim 16.

47. A method of controlling microbiofouling in an aqueous system which comprises
2 adding to the aqueous system an effective, anti-microbiofouling amount of the solution of
Claim 23.

48. A method of controlling microbiofouling in an aqueous system which comprises
2 adding to the aqueous system an effective, anti-microbiofouling amount of the solution of
Claim 24.

49. A method of preventing microbiofouling on the surfaces of equipment in contact
2 with in an industrial water system which comprises adding to the aqueous system an anti-

microbiologically effective amount of a stabilized sodium hypobromite solution, said

4 solution having been prepared by the steps of:

a. Mixing an aqueous solution of alkali or alkaline earth metal hypochlorite

6 with a water soluble bromide ion source;

b. Allowing the bromide ion source and the alkali or alkaline earth metal

8 hypochlorite to react to form a 0.5 to 30 percent by weight aqueous solution of
unstabilized alkali or alkaline earth metal hypobromite;

10 c. Adding to the unstabilized solution of alkali or alkaline earth metal
hypobromite an aqueous solution of an alkali metal sulfamate having a temperature of at
12 least 50°C in a quantity to provide a molar ratio of sulfamate to hypobromite of from
about 0.5 to about 6; and then,

14 d. Recovering a stabilized aqueous alkali or alkaline earth metal hypobromite
solution.

50. The method according to Claim 49, wherein the industrial water system is a
2 cooling water system.

51. The method according to Claim 49, wherein the industrial water system is a gas
2 scrubber system.

52. The method according to Claim 49, wherein the industrial water system is an air
2 washer system.